

**MUTOMO SUB-COUNTY KCSE REVISION MOCK EXAMS  
2015**

**233/1**

**CHEMISTRY**

**PAPER 1**

**(THEORY)**

**TIME: 2 HOURS**

**SCHOOLS NET KENYA**

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NAME \_\_\_\_\_  
SCHOOL \_\_\_\_\_

INDEX NO. \_\_\_\_\_  
SIGNATURE \_\_\_\_\_  
DATE \_\_\_\_\_

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**CHEMISTRY**

**PAPER 1**

**(THEORY)**

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**MUTOMO SUB-COUNTY KCSE PACESETTER, 2015**  
**Kenya Certificate of Secondary Education (K.C.S.E)**

233/1

CHEMISTRY

PAPER 1

(THEORY)

TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES

1. Write your name, school and index number in the spaces provided above.
2. Sign and write the date of examination in the space provided above.
3. Answer **ALL** the questions in the spaces provided.
4. Mathematical tables and silent electronic calculators may be used.
5. All working **MUST** be clearly shown where necessary.

FOR EXAMINER'S USE ONLY

QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
1 – 29	80	

*This paper consists of 12 printed pages.*

*Candidates should check to ensure that all pages are printed as indicated and no questions are missing.*

1. a) Oxygen is obtained by fractional distillation of liquid air. Name **two** other gases which are obtained from this process during distillation. (1 mark)

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- b) Give **two** industrial uses of oxygen gas. (2 marks)

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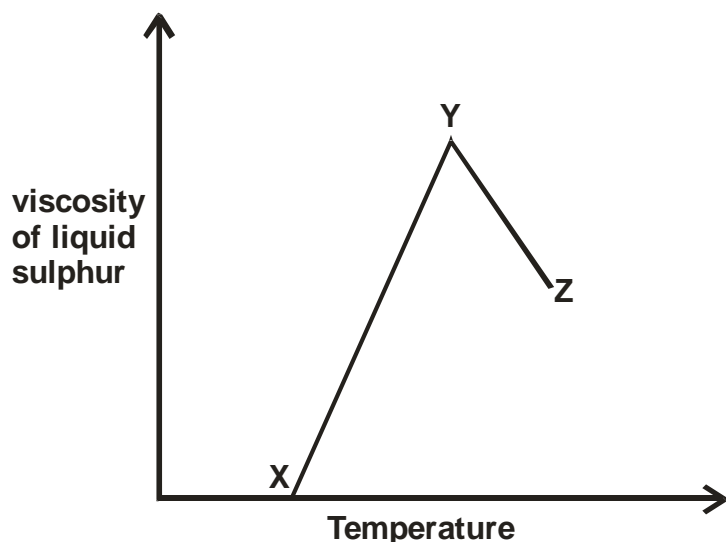
2. Study the table below and complete the property column. (3 marks)

Substance	Uses	Property
Carbon (IV) oxide	Refrigeration	1.
	Fire extinguishers	2.
Graphite	Making electrodes	1.
	Making pencil leads	2.
Sodium	Street lights	1.
	Coolant in nuclear reactors	2.

3. A sample of 0.5g of gaseous alkane occupied a volume of 200cm<sup>3</sup> at s.t.p.  
 a) Determine the molar mass of the alkane. (C = 12.0, H = 1.0, Molar gas volume = 22.4dm<sup>3</sup>) (1 mark)

- b) Determine the molecular formula of the alkane and give its I.U.P.A.C name. (2 marks)

4. The graph below shows the changes in viscosity in liquid sulphur on heating. Use it to answer the questions that follow.



Explain what happens in the region:

- i) XY (1 mark)

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- ii) YZ (1 mark)

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5. State **one** use of each of the following radioactive isotopes. (2 marks)

- i) Cobalt – 60

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- ii) Phosphorus – 32

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6. You are provided with  $20.0\text{cm}^3$  of 2M sodium hydroxide solution. Explain how you would prepare a solution of sodium hydroxide whose concentration is 0.16M. (3 marks)

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7. During the extraction of zinc, zinc oxide is mixed with coke and limestone. The mixture is then fed into a blast furnace.

a) State **two** sources of zinc oxide (1 mark)

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b) State any **two** functions of coke . (1 mark)

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c) State **two** uses of zinc. (1 mark)

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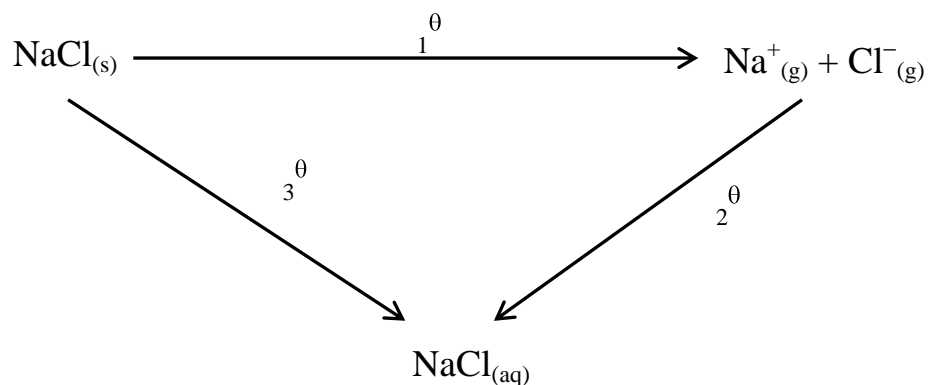
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8. Use dot (•) and cross (×) diagrams to illustrate bonding in:

i) Magnesium fluoride (1 mark)

ii) Hydroxonium ion (1 mark)

9. Study the energy cycle diagram below and answer the questions that follow.



- a) Show the relationship between  $\Delta H_1^\theta$ ,  $\Delta H_2^\theta$  and  $\Delta H_3^\theta$  (1 mark)

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- b) Determine the value of  $\Delta H_1^\theta$  given that  $\Delta H_3^\theta = +4\text{kJ/mol}$  and  $\Delta H_2^\theta = -774\text{ kJ/mol}$  (1 mark)

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- c) Give the name of the enthalpy changes: (1 mark)

- i)  $\Delta H_1^\theta$  \_\_\_\_\_
- ii)  $\Delta H_2^\theta$  \_\_\_\_\_

10. Explain the following:

- i) When Calcium Chloride crystals are exposed to the atmosphere for some days a solution is formed. (1 mark)

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- ii) In areas near sea, copper objects often change colour to green after some days. (1 mark)

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- iii) When a beaker with limewater is left exposed to atmosphere for a long time, a thin layer of a white solid forms on its surface. (1 mark)

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11. State **two** differences between nuclear fusion and nuclear fission. (2 marks)

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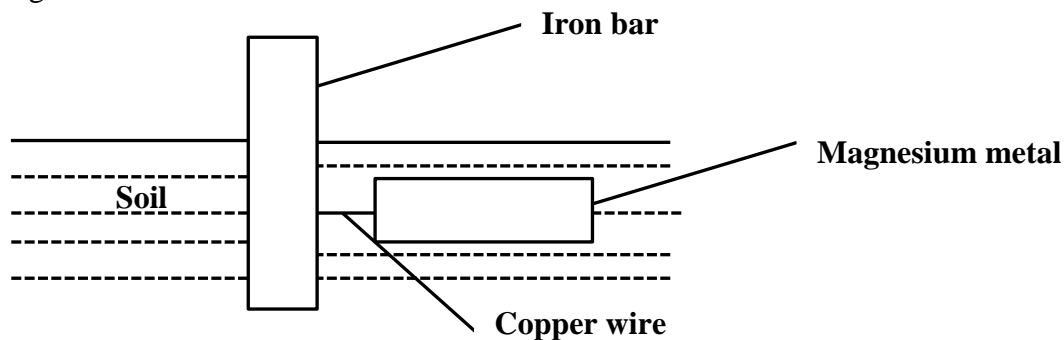


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12. The diagram below shows an iron bar which supports a bridge. The iron bar is connected to a piece of magnesium metal.



Explain why it's necessary to connect the piece of magnesium metal to the iron bar. (2 marks)

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13. In terms of structure and bonding explain why silicon (IV) oxide exists as a solid when sulphur (VI) oxide exists as a gas. (2 marks)

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14. 1.9g of magnesium chloride was dissolved in water. Silver nitrate solution was added until in excess. Calculate the mass of silver nitrate that was used for complete reaction. (Mg = 24.0, Cl = 35.5, Ag = 108.0, N = 14.0, O = 16.0) (3 marks)

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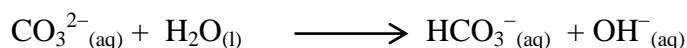
15. Some drops of dilute Nitric (V) acid were added to a test solution followed by a few drops of silver nitrate solution. A white precipitate which turned violet after exposure to light was formed.

a) Name the anion present in the test solution. (1 mark)

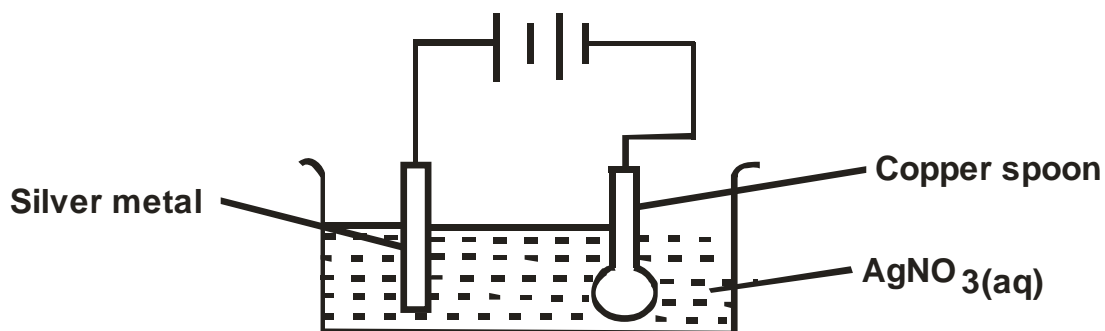
b) Why was dilute nitric (V) acid added before the solution of silver nitrate was added? (1 mark)

c) Write an ionic equation for the reaction that formed the white precipitate. (1 mark)

16. State and explain the substance that acts as the acid in the forward reaction. (2 marks)



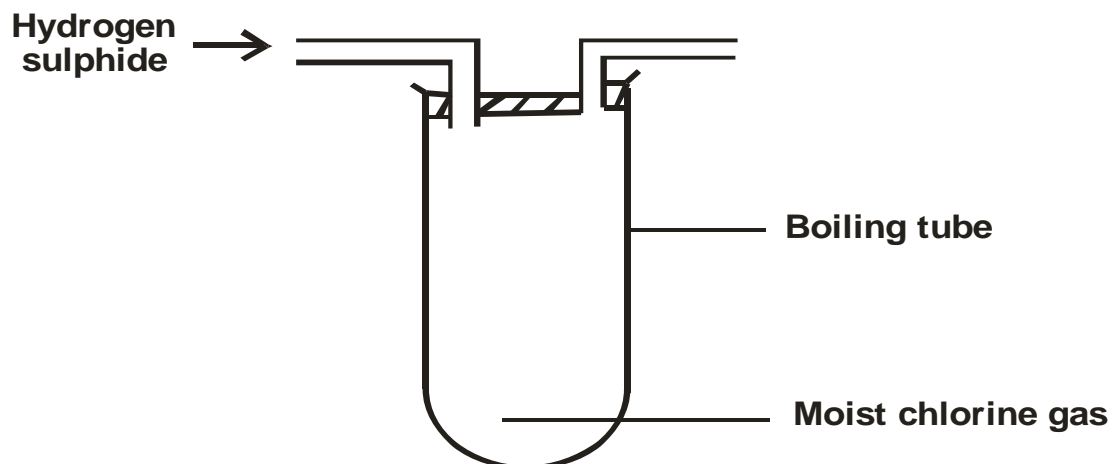
17. A copper spoon was coated with silver metal as shown below.



i) Write an equation for the reaction that occurs at the copper spoon cathode. (1 mark)

ii) How many grams of silver would be deposited on the spoon in two hours using steady current of 0.03A? (1 F = 96500C, Ag = 108.0) (3 marks)

18. In an experiment, hydrogen sulphide gas was passed into moist chlorine gas as shown in the following diagram.



- a) State and explain the observations made in the boiling tube (2 marks)

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- b) Giving a reason, state the precaution that should be taken when carrying out this experiment. (1 mark)

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19. Describe how you would prepare a dry sample of crystals of sodium sulphate starting with  $100\text{cm}^3$  of 2M sulphuric (VI) acid solution. (3 marks)

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20.  $100\text{cm}^3$  of propane diffuses through a porous plug in 20 seconds. How long would it take  $80\text{cm}^3$  of methane gas to diffuse through the same plug? (C = 12.0, H = 1.0) (3 marks)

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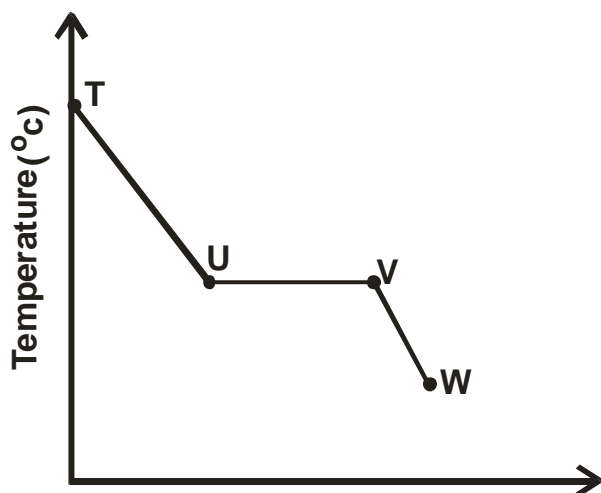


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21. The sketch below shows a graph of temperature against time obtained when a gaseous substance was cooled.



Explain what happens to the gaseous substance between:

- a) T and U (1 mark)

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- b) U and V (1 mark)

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- c) V and W (1 mark)

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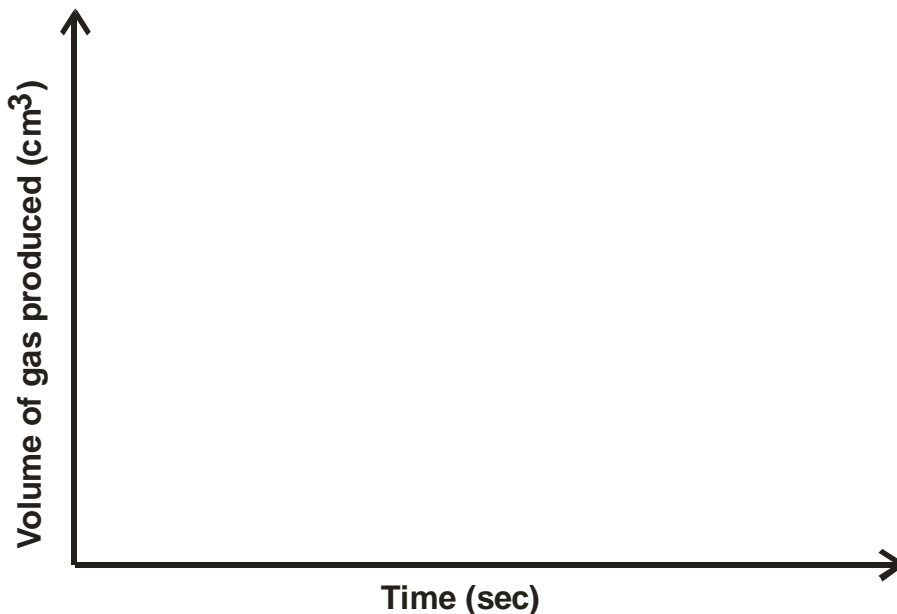
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22. A series of experiments were done using 0.1g pieces of magnesium and dilute hydrochloric acid.

The following results were obtained.

Experiment	Concentration of acid ( $\text{mol/dm}^3$ )	Temperature ( $^{\circ}\text{C}$ )
1	0.5	25
2	1.0	25
3	0.5	20

- a) On the grid provided sketch the curve obtained when the volume of gas produced was plotted against time for each of the experiments and label each as 1, 2 or 3. (3 marks)



- b) Write an equation for the reaction that took place (1 mark)

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23. The table below shows condensed structural formulae of some organic compounds. Use it to answer the questions that follow.

Compound	Structural formula
A	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$
B	$\text{CH}_3\text{CH}_2\text{COOH}$
C	$\text{CH}_3\text{CHCH}_2$
D	$\text{CHCCH}_3$
E	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$

- a) State and explain the difference in the boiling points of compounds A and E. (2 marks)

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- b) Write an equation to show the reaction between compounds B and E and give the name of the product formed. (2 marks)  
Equation.

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Name of product:

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- c) Give **one** chemical test that can be used to identify compound C. (1 mark)

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24. Washing soda (sodium carbonate decahydrate) can be used to remove water hardness.

- a) Name the two types of water hardness . (1 mark)

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- b) Name one compound responsible for each of the types of water hardness you have identified in (a) above. (1 mark)

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- c) Write an ionic equation to show how washing soda removes the two types of hardness. (1 mark)

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25. When air is bubbled through pure water of pH 7.0, the pH drops to 6.0. Explain. (2 marks)

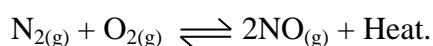
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26. Nitrogen and oxygen gases react according to the equation given below;



- a) Explain the effect of increasing temperature on the yield of nitrogen (II) oxide. (2 marks)

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- b) If  $200\text{cm}^3$  of nitrogen were used, determine the volume of nitrogen (II) oxide gas produced. (1 mark)

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27. The table below shows some properties of substances I, J, K and L.

Substance	Electrical conductivity		M.P	B.P
	Solid	Molten	°C	°C
I	Does not	Conducts	808	1420
J	Conducts	Conducts	850	1487
K	Does not	Does not	1700	444
L	Does not	Does not	113	

Identify the substances with:

a) A metallic bond (1 mark)

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b) A covalent bond (1 mark)

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c) An ionic bond (1 mark)

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28. Heated iron forms iron (III) chloride when reacted with chlorine and iron (II) chloride when reacted with hydrogen chloride gas. Explain this difference. (1 mark)

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29. Diamond and graphite are both allotropes of carbon. Explain why graphite is a good conductor of electricity while diamond is not. (2 marks)

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